

Monitoring Amphibians at Mount Rainier National Park

Introduction

Mount Rainier National Park encompasses 236,381 acres of land in Washington State and includes a wide range of ecosystems. There are approximately 385 lakes and more than 400 streams in the park, and these aquatic ecosystems provide crucial habitats to many amphibian species. Most amphibians spend a portion of their lives in aquatic habitats, and they can be greatly impacted by changing environmental conditions. Therefore, monitoring amphibian species abundance can indicate water quality and overall ecosystem health.

Fourteen species of amphibians are known to occur in the park including nine species of salamanders and five species of frogs/toads. One species of particular interest is the western toad (*Anaxyrus boreas*), currently considered a candidate species for listing by Washington State. The Southern Rocky Mountain population known as the boreal toad (*Anaxyrus boreas boreas*) is under review for listing under the federal Endangered Species Act. At Mount Rainier National Park the western toad is considered one of the least common amphibians in the park.



Figure 1. Western toad (*Anaxyrus boreas*) juvenile.

What are we doing?

We are monitoring amphibian abundance throughout Mount Rainier National Park, concentrating our efforts at sites where western toads are known to occur. We monitor the phenology of western toad larva and document changes in ephemeral breeding habitats. Our project volunteers have also monitored amphibian mortality at select lakes, conducted night surveys, and surveyed for larval dragonflies.



Figure 2. Volunteer Elmer Bartley taking body measurements of a northwestern salamander larva.

Monitoring Objectives

1. Engage volunteers in park science through active participation in field data collection
2. Monitor amphibian populations at western toad breeding sites throughout the park
3. Provide data to the National Park Service on the status of aquatic environments and dependent species within Mount Rainier National Park

Monitoring Methods

- Surveys occur from early July to early September
- On average we visit 24 sites per season
- We are using a survey method called a Visual Encounter Survey (VES) to monitor amphibian species abundance
- At Western Toad breeding sites we document specific life stage and size of larval toads (tadpoles), making repeat visits to some sites over the course of the season

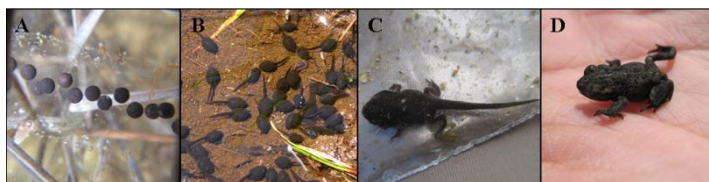


Figure 3. Western toad A) egg string, B) tadpoles, C) larva undergoing metamorphosis, and D) recently metamorphosed juvenile found during the 2016 season.

Results: Volunteer Involvement

The Citizen Science Amphibian Monitoring Program at Mount Rainier National Park began in 2009. Since that time 171 volunteers have completed 214 amphibian surveys and contributed a total of 3,286 hours. Twelve individuals have volunteered their time over several seasons. In 2009, survey efforts were directed towards small ponds, ephemeral pools, and wetlands. Beginning in 2010, we changed focus and concentrated our effort on surveying the few western toad breeding sites known to occur in the park. In 2013, volunteers helped with Chytrid¹ sampling at 8 lakes in the park and beginning in 2014 some volunteers started collecting dragonfly larva for the Dragonfly Mercury Project.

¹a fungal disease that affects amphibians

Table 1. Total number of hours, volunteers, and surveys by year, 2009 – 2016.

YEAR	HOURS	VOLUNTEERS	SURVEYS
2016	615	43	25
2015	345	28	15
2014	393	26	16
2013	447	27	17
2012	321	16	23
2011	295	20	31
2010	530	17	37
2009	340	19	50

Results: Amphibians

Volunteers have documented 8 species of amphibians (3 salamanders and 5 frogs) at 103 sites between 2009 and 2016 (Figure 3). More than 98,000 amphibians have been counted by volunteers over the last 8 seasons. The most common species observed during volunteer surveys have been western toads and cascades frogs which reflect in part our survey efforts at western toad sites. With the help of volunteers we have documented western toads breeding at 3 new sites.



Figure 4. Citizen Science Coordinator measuring lake depth at Mirror Lakes.

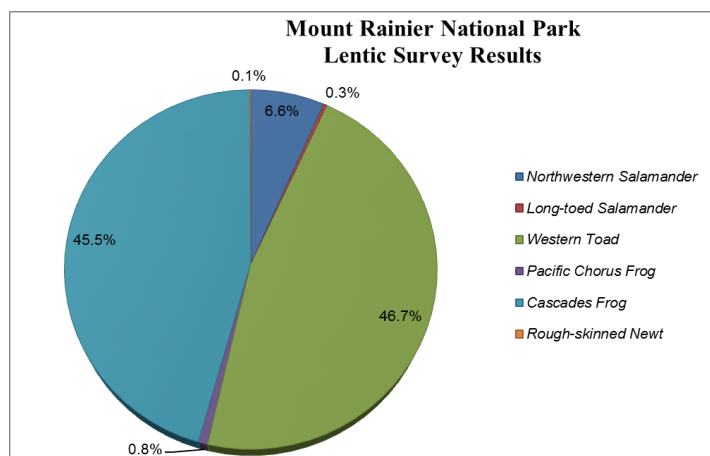


Figure 5. The six most common amphibian species documented by volunteers at Mount Rainier National Park during lentic² surveys (all life stages except eggs and egg masses) at 103 sites between 2009 and 2016, northwestern salamander (*Ambystoma gracile*) 6,147, long-toed salamander (*A. macrodactylum*) 259, western toad (*Anaxyrus boreas*) 43,823, pacific chorus frog (*Pseudacris regilla*) 782, cascades frog (*Rana cascadae*) 42,702, rough-skinned newt (*Taricha granulosa*) 98.

²lentic ecosystem refers to still bodies of water, such as lakes, ponds and wetlands

2016 Accomplishments

- Monitored western toad phenology at 5 of 7 currently known active breeding sites
- Documented changes in ephemeral amphibian breeding habitat
- Discovered one new toad breeding site
- Monitored northwestern salamander mortalities at an eastside lake
- Collected dragonfly larvae at 4 sites for the Dragonfly Mercury Project:

http://www.nature.nps.gov/air/studies/air_toxics/dragonfly/index.cfm

Interested in Helping?

Each summer from July through September we need volunteers to help conduct our surveys. The Citizen Science program gives volunteers of all ages the opportunity to hike and explore some of Mount Rainier's lakes and wetland habitats while gaining experience in surveying and science. Previous experience is not needed and surveying equipment will be provided. Free camping is available for volunteers at park campgrounds.

More Information

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